ABSTRACT OF THE INVENTION

An A and/or A' site deficient perovskite of general formula of $(A_{1-x}A'_x)_{1-y}FeO_{3-\delta}$ or of general formula $A_{1-x-y}A'_xFeO_{3-\delta}$, wherein A is La alone or with one or more of the rare earth metals or a rare earth metal other than Ce alone or a combination of rare earth metals and X is in the range of from 0 to about 1; A' is Sr or Ca or mixtures thereof and Y is in the range of from about 0.01 to about 0.3; δ represents the amount of compensating oxygen loss. If either A or A' is zero the remaining A or A' is deficient. A fuel cell incorporating the inventive perovskite as a cathode is disclosed as well as an oxygen separation membrane. The inventive perovskite is preferably single phase.